

Husky Retro Undercounter Refrigerator

Engineer's Service Manual

ENGLISH



Contents

Specifications5

Safety Precautions..... 6-7

Function Schedule8

System Flow Chart.....8

Circuit Diagram.....8

General Instructions 9-11

Maintenance Service & Troubleshooting 12-15

 1. No cooling..... 12

 2. The compressor doesn’t stop 13

 3. Cooling capacity is insufficient..... 14

 4. The compressor doesn’t work 15

 5. Normal phenomena – no service issue 16

 6. Common problems with refrigerators and their remedies 17

 7. Analysis of problems, and their solutions 19

Exploded Diagram 30

Parts List.....31

Specifications



CAPACITY

Gross Total/Litres	130
Nett Total/Litres	115

PERFORMANCE

Climate Class	N
EC Energy rating	A+
Power	220-240v 50Hz
Power Input	110w
Energy Consumption kWh/24h	0.31
Noise Level dB(A)	39

FEATURES

Temp. Control	Manual: 0-7 (7 = coldest)
Performance	0-10°C
Reversible Door	Yes
Adjustable Feet	Yes, two at the front
Plug	UK
Finishing	Painted
Unit Colour	Gloss Black
Interior	White
Husky Branding	Husky logo
Refrigerant/Charged Volume	R600/29g
Foam Blowing Agent	Cyclopentane

DIMENSIONS

Nett HxWxD (mm)	840x550x550
-----------------	-------------

Standard Packaging Dimensions HxWxD (mm)	865x580x595
------------------------------------------	-------------

Weight Nett/Gross Standard Packaging (Kgs)	31/34
--------------------------------------------	-------

REFRIGERATOR COMPARTMENT FEATURES

Shelf (Material/No)	Tempered glass with silver plastic coloured trim/Two plus half shelf over salad crisper drawer
Door Storage	Three shelves with silver plastic coated metal wire retainers
Interior Light	Yes
Wine Rack	Yes, shelf hanging, suitable for two bottles
Lock	No

MISCELLANEOUS

Lead Time	Approx. 12 weeks from order
Country of origin	PRC
Suitability	Domestic/Light Commercial
Container quantity (standard packaging)	
40' HC Container Load	238

APPROVAL

Approval	CE, RoHS, LVD, EMC
----------	--------------------

© 2014 Husky Retail Ltd. We reserve the right to change product specifications at any time without notice,

Safety Precautions



Do not damage power cable

Be sure not to pull out the plug of the appliance by drawing the power cable. Be sure to directly pull it of the outlet by firmly grasping the plug. Do not move the appliance by pressing the power cable, or tread on it. When moving the appliance from wall, be careful not to roll or damage power cable.

In case of damaged power cable

If the power cable or plug was damaged, it is prohibited to continue using it. In this case, it must be replaced by technician or authorised service personnel.

Do not put bottled beer or beverages in the freezer compartment to prevent risk of cracking.



This appliance uses 220-240V~50Hz AC for its power supply

Failure in operation and damage to the control panel, thermostat or the compressor will occur if voltage is outside the range 187-242V, unless a regulator with a capacity of 750W or higher is installed.

It is required to use separate, special outlet with secure grounding

The power cable of this appliance is fitted with three-core (grounding) plug complying with three-core (grounding) outlet. In no case should the third plug pin (grounding) of the power cable be cut or removed.

When there is leakage of inflammable gas

Never try to pull out or insert any power plug for any electrical appliance such as refrigerator.

Electricity plug must be cut off for below following situations

- Pull out power plug prior to cleaning or repairing;
- When replacing damaged lamp, it is required to pull out power plug to prevent electrical shock.

It is absolutely prohibited to put hazardous flammable or explosive articles, strong corrosive acid, alkali, etc inside the appliance.

Safety Precautions are continued on the following page

Safety Precautions (continued)



Do not keep medicine, vaccine, or chemical agents in the appliance. This refrigerator is for household use, and cannot store items with strict requirement for temperature.

Do not store or use gasoline or other flammable article in the vicinity of the refrigerator, to avoid fire.

Do not place any electrical plugs, regulators or microwaves on top of the refrigerator. Do not use electric appliances (except those allowed by the manufacturer) inside the refrigerator.

Do not play by hanging on its door, to prevent tilting the door or toppling the refrigerator which may result in personal injury.

Do not place heavy or unstable articles or water containers on top of the refrigerator.

When the refrigerator has started running, take care not to touch the cold surface of the freezer compartment with hand, especially with wet hand. Otherwise, your skin may become stuck on the cold surface.

Do not spray water onto the refrigerator, or place it in wet area where water may be easily splashed, to avoid influencing the electric insulation performance of the appliance.

It is strictly prohibited to privately dismantle or change the appliance component. Repairs may only be carried out by professional personnel.

In case of unstable power supply, or during cleaning, it is required to pull out the power plug, and to wait at least five minutes for switching on it again to prevent damaging its compressor by continuous starting.

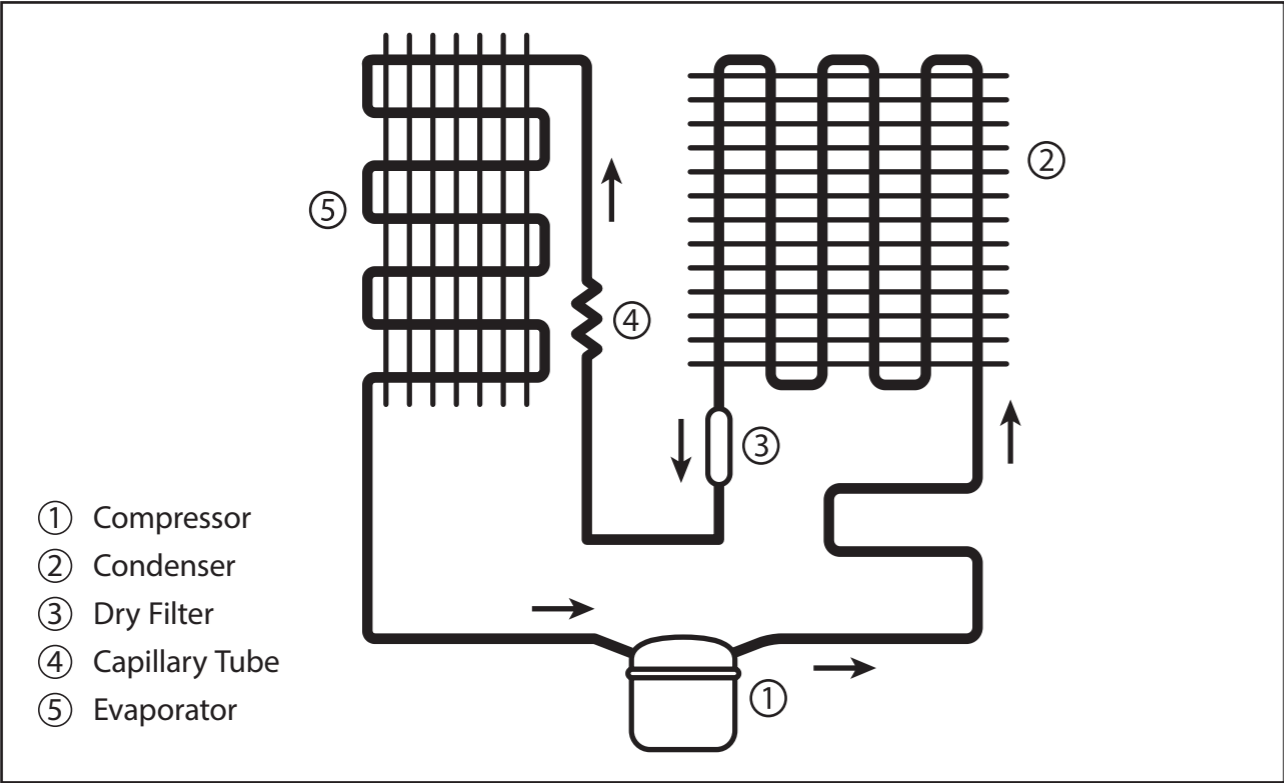
If the door or door gasket of the appliance is to be removed, prevent children from playing inside, to avoid risk of accident.

Function Schedule

- Energy efficiency
- Low noise operation
- Thick insulation for energy efficiency.

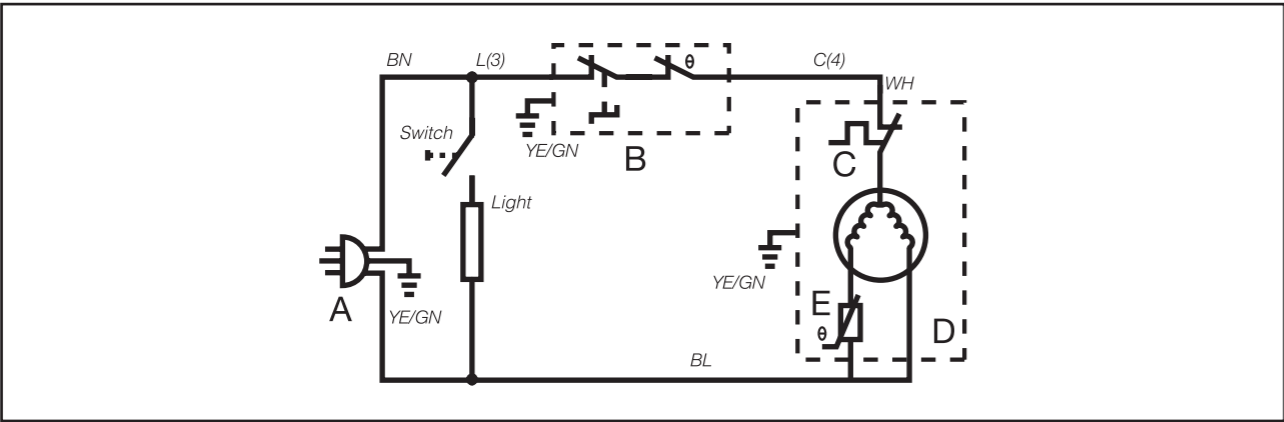
System Flow Diagram

The Husky Retro Refrigerator is a direct cooling single-system larder. When the refrigerator is powered on, the refrigerant flows in the sequence ① > ② > ③ > ④ > ⑤ > ①



Circuit Diagram

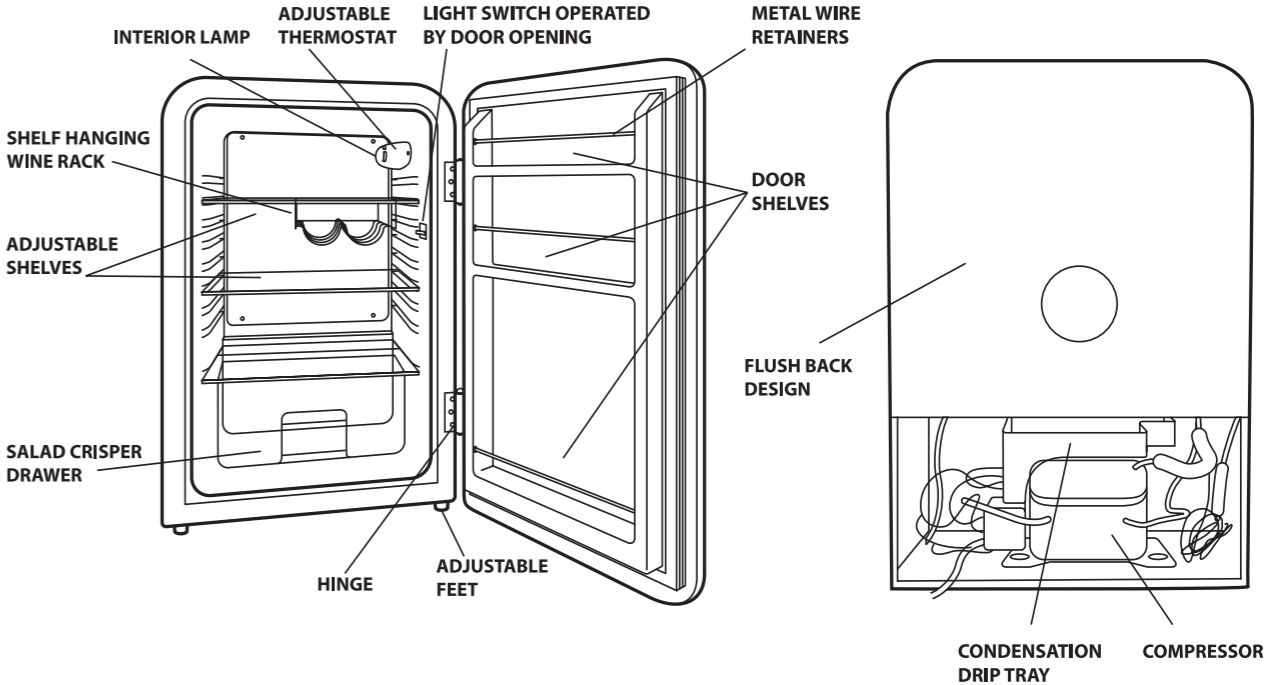
The Husky Retro Refrigerator is a direct cooling single-system larder. A mechanical type of all the control is generally adopted. The thermostat directly controls the start and stop of compressor, and hence the refrigerator temperature.



General Instructions

Before using for the first time

- For good circulation, the vent at the back of the Refrigerator must not be blocked. Keep a minimum of 100mm of clear space between the back of the Refrigerator and the wall, and 50mm between the sides and the wall. Your Husky Retro Refrigerator should be placed on flat and firm surface for quieter operation.
- If the Refrigerator is to be placed on carpet, support it with a wooden board underneath. Be aware that placing the Refrigerator on carpet may mean that heat from the compressor may cause the carpet to fade.
- Do not expose the Refrigerator to direct sunlight or a heat source such as ovens, radiators, heaters, etc.
- Do not under any circumstances place heated food or beverages in your Husky Refrigerator.
- Do not open the door more often than necessary to lessen the escape of cold air.
- For better air circulation, do not overfill the Refrigerator.
- Adjust the thermostat according to the amount of product and the ambient temperature.



To operate

Before switching your Husky Retro Refrigerator on, we recommend you allow it to stand for 12 hours.

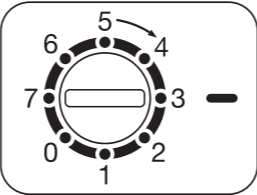
1. Clean the inner compartment.
2. Plug in your Husky Refrigerator.
3. The first time you turn the Refrigerator on, check the thermostat to ensure it is set to “4” and leave at this position for 20 minutes. After this time, adjust the temperature control setting as per the guide for setting the thermostat below.
4. To turn the Refrigerator off, turn the thermostat to the “0” position and disconnect the plug from the mains supply.



NOTE: If the Refrigerator is unplugged or power lost, you must wait 3 to 5 minutes before restarting. If you attempt to restart the Refrigerator before this delay, the Refrigerator will not start.

Thermostat settings

Thermostat “0” position indicates the Refrigerator is turned off although power is still being supplied. By turning the thermostat dial clockwise, the Refrigerator will turn on automatically. The settings 1 (MIN) – 7 (MAX) regulate the interior temperature of the Refrigerator.



- Setting 0 = Off (not operating)
- Setting 1 (or MIN) = lowest setting (warmest internal temperature)
- Setting 7 (or MAX) = highest setting (coldest internal temperature).

Adjust the internal temperature as required according to the amount of product and the ambient temperature. Guide for the thermostat settings are as follows:

- Winter — Setting 1-2
- Spring and Autumn — Setting 2-4
- Summer — Setting 4-6

The internal temperature varies in different parts of the Refrigerator. The back of the Refrigerator is coldest.

Reversing the door

The door can be opened from left to right and vice versa. Should you wish to change the opening direction, please follow these instructions.

Note: all parts removed should be kept safely. You will require these for the reinstallation of the door.

- Support the door from the bottom
- Remove the six screws that affix the hinges and two spacers to the cabinet frame
- Place the door flat on a padded surface to prevent scratching
- Remove the six hinge screws that affix the hinges to the Retro door
- Remove the blanking plugs from the opposite side and use to plug the holes exposed by the removal of the hinge
- Screw the hinges onto the opposite side of the door
- Pick the door up and carefully align with the cabinet holes
- Screw the remaining six screws into both hinges and the two spacers into the cabinet to secure the door.

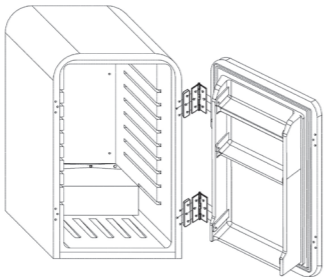


Fig 1 Position of components prior to reversal of the door hinge.

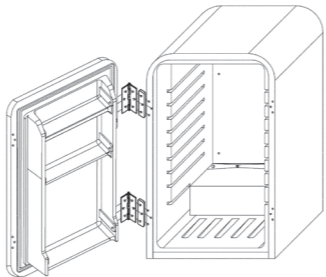
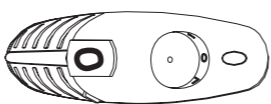
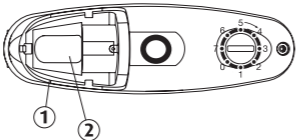


Fig 2 Position of components after reversal of the door hinge.

Changing the LED light bulb

BEFORE REMOVING THE LIGHT BULB, YOU MUST UNPLUG THE UNIT. FAILURE TO DO SO MAY RESULT IN ELECTRICAL SHOCK OR PERSONAL INJURY.

- Remove the light bulb cover (1) by gently pulling the bottom edge of the light bulb cover.
- Unscrew the bulb (2) Fit a 1w E14 LED bulb that is the same shape and size.
- IMPORTANT: replace the light cover to its original position.



Defrosting

The surface of the evaporator ices up when the Refrigerator is working. This is an entirely normal part of operation. If the frost layer is more than 3mm/1/8” thick, the Refrigerator must be defrosted and cleaned to avoid unnecessary energy consumption and inefficient operation.

- Remove all items inside and unplug the Refrigerator.
- After defrosting, clean the Refrigerator (see instructions below) and allow it to dry. Reconnect to the mains supply and follow the directions ‘To Operate Your Husky Retro Refrigerator’ on page 5.

Cleaning

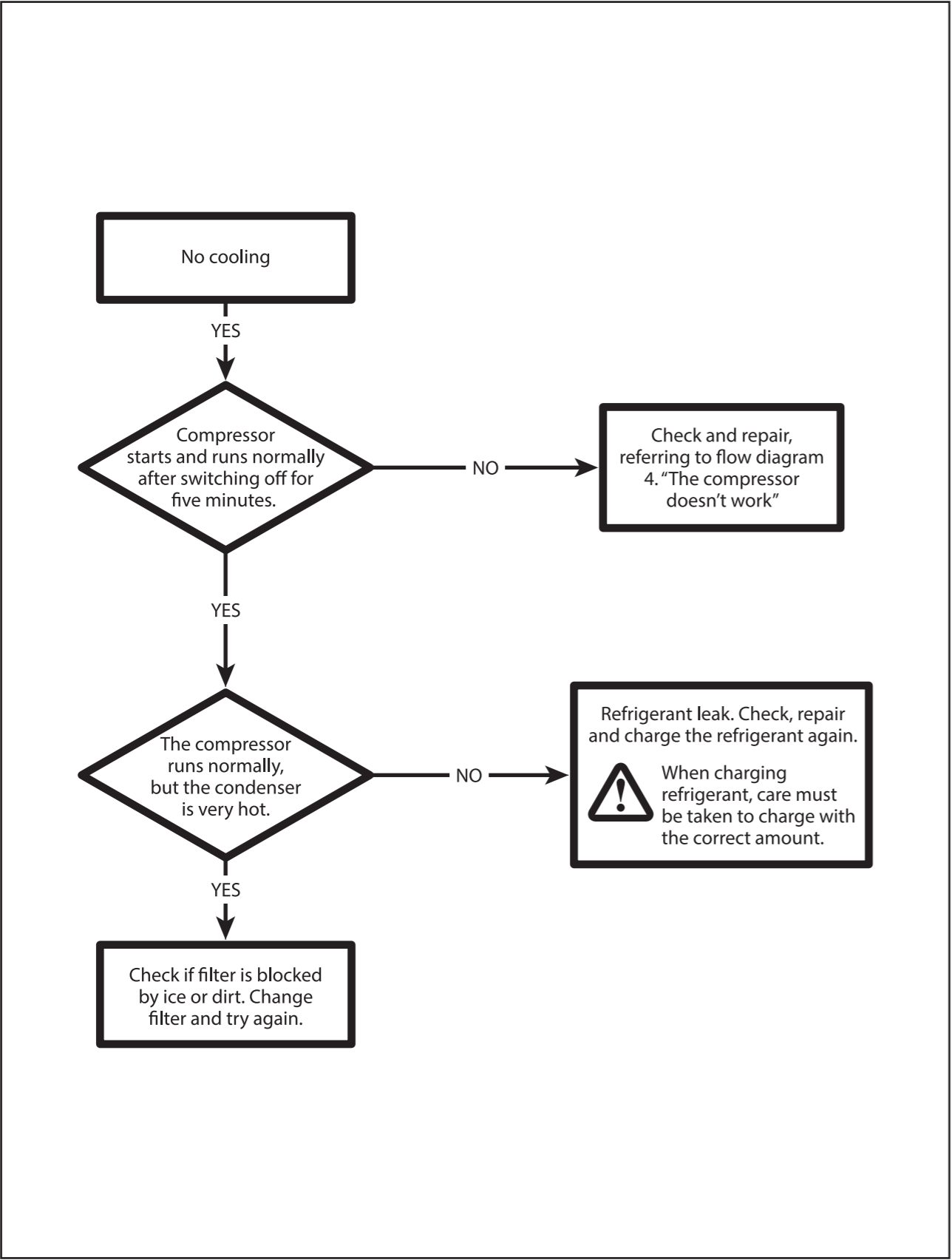
The exterior may be cleaned using a microfibre cloth or similar. DO NOT use abrasive products on the exterior of the unit as this could damage the painted finish. To ensure efficient operation the back and bottom of the chiller should be cleaned thoroughly. Note: do not use abrasive cleaners!

- Unplug your Husky Refrigerator.
- Wipe the interior with warm water and neutral detergent.
- Dry all surfaces thoroughly.
- Use mild soapy water to clean the door seal.

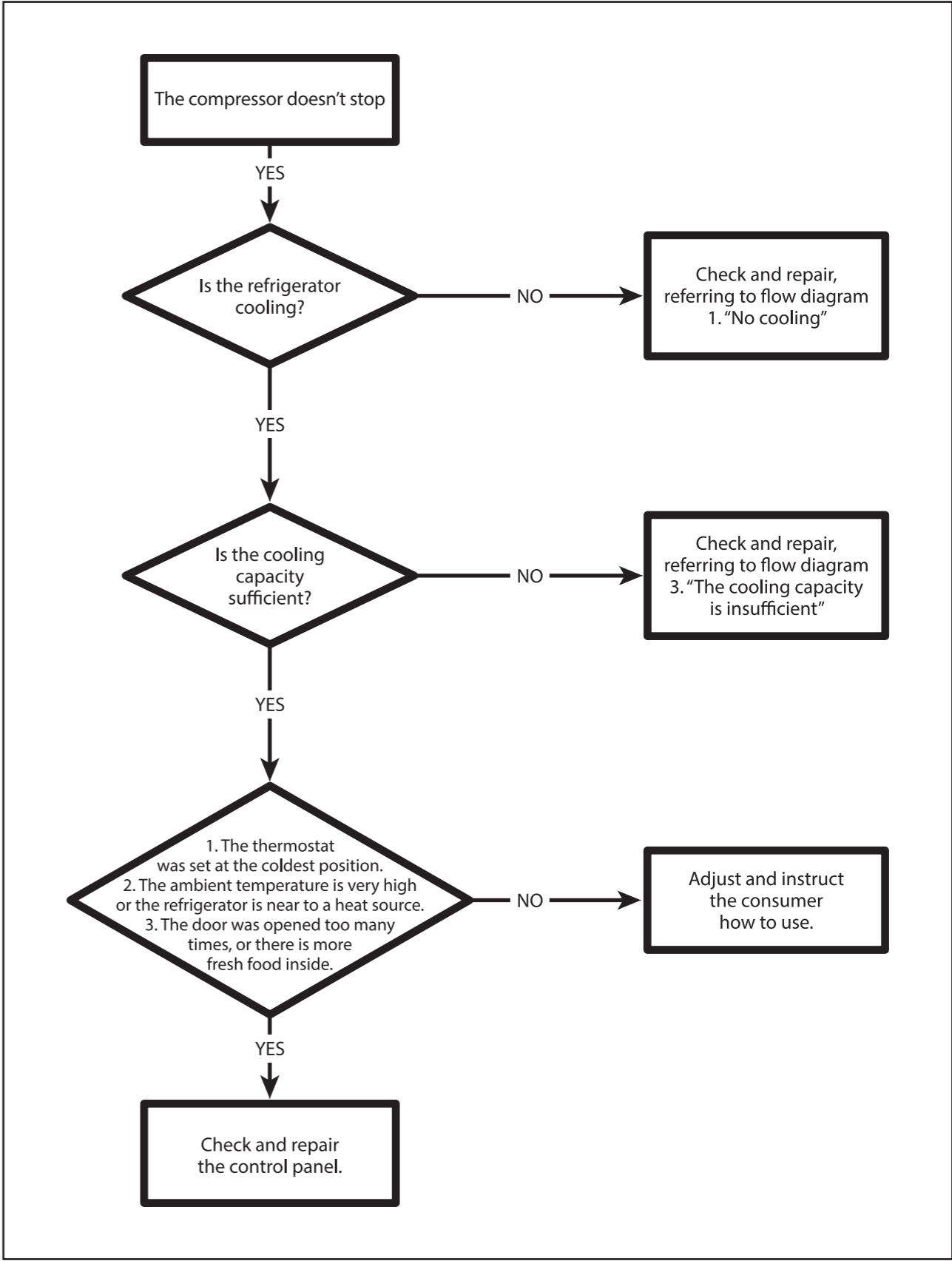
When not in use for long periods

- Unplug your Husky Refrigerator.
- Clean and dry the inside of the Refrigerator. Leave the door slightly open to allow it to dry completely.
- A chiller which is unused without being cleaned may start to smell musty or develop mildew.

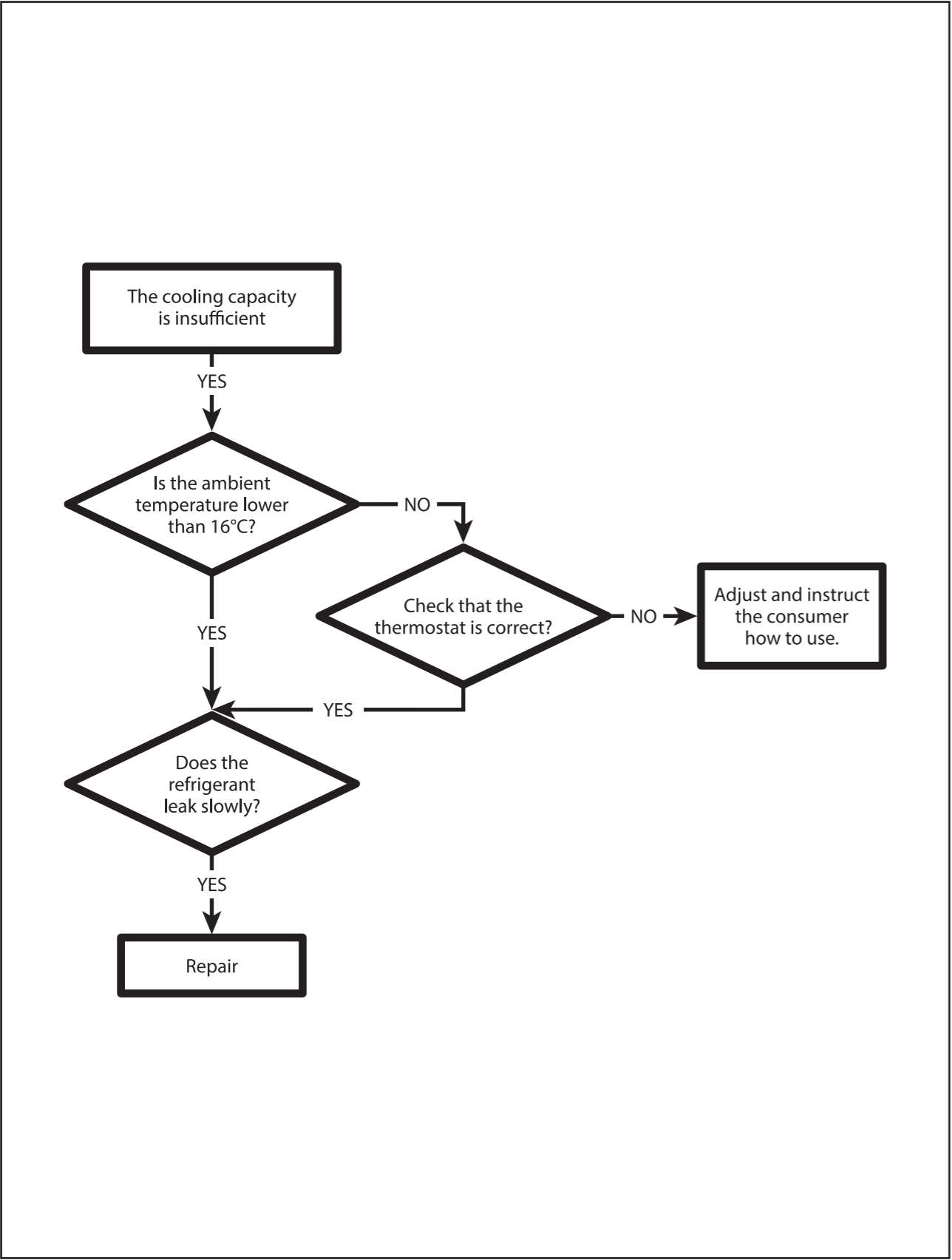
Maintenance Service & Troubleshooting:
1. No cooling



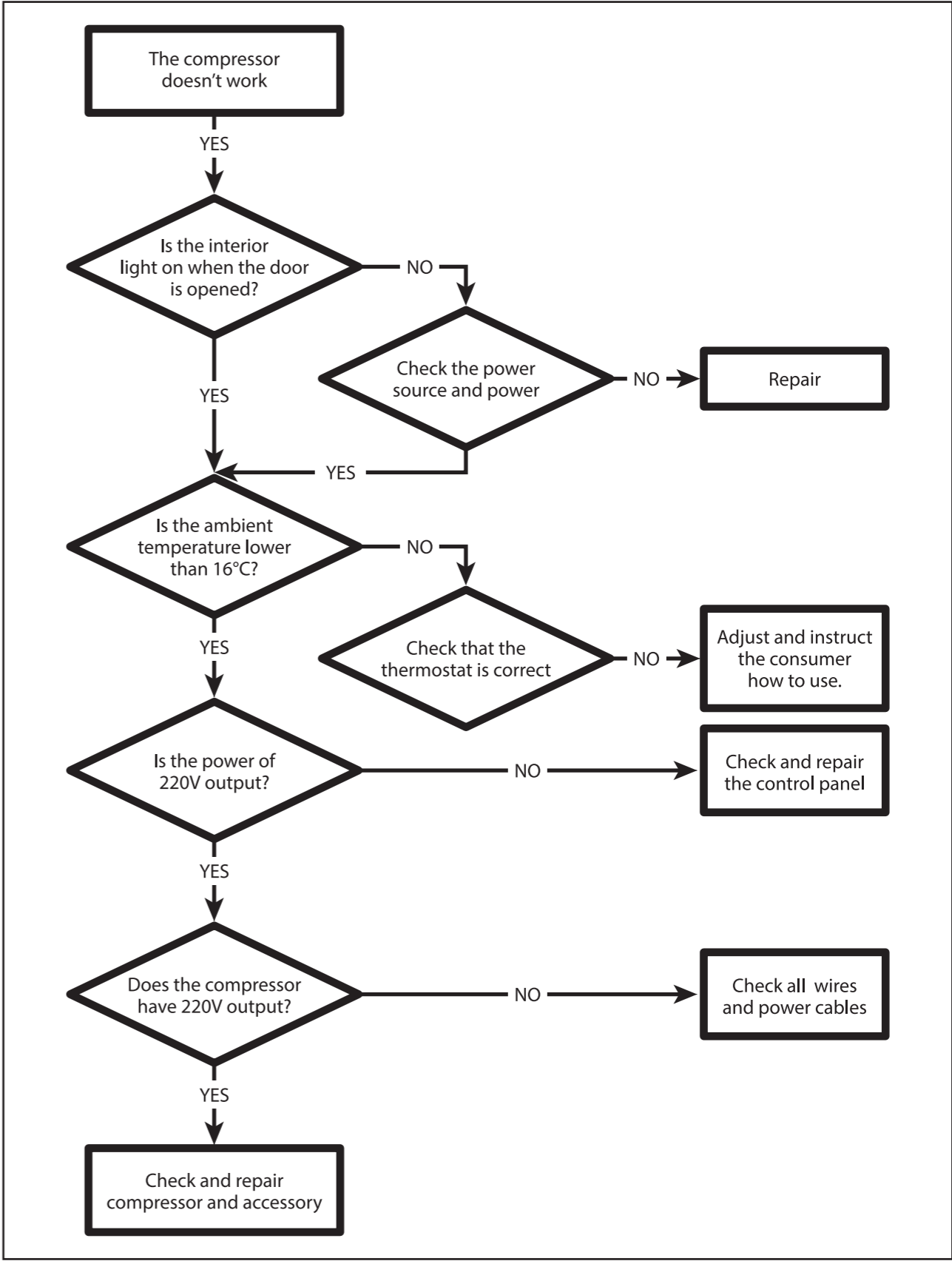
Maintenance Service & Troubleshooting:
2. The compressor doesn't stop



Maintenance Service & Troubleshooting:
3. The cooling capacity is insufficient



Maintenance Service & Troubleshooting:
4. The compressor doesn’t work



Maintenance Service & Troubleshooting:

5. Normal phenomena – no service issue

In a domestic refrigerator, there is not only a complicated electric control system, but also a refrigerating system that makes it difficult to discern whether it is in a good working condition. Both the systems are related and affect each other. If a certain part of a refrigerator works abnormally, its refrigerating efficiency will decrease, operation properties will become unstable, or even it cannot be used normally for those serious cases.

Refrigerators are generally of larger volume. Once problems appear it may be difficult to determine if a service department should be involved. The user may be confused: sometimes normal phenomena will be wrongly identified as service issues. Therefore before we deal with the topics of frequently occurring problems of refrigerators and their remedies, we should firstly give a brief account of some normal phenomena which are not problems. If such phenomena occurs the user may continue to use the unit without concern.

1. When the compressor of a refrigerator stops working, a rumbling sound can be heard from inside its evaporator. This sound is caused by the flowing of refrigerant in the evaporator tubing. Because the pressure difference is still greater after the compressor has stopped, the refrigerant will flow for a certain time, therefore this sound is a normal phenomenon.
2. A clicking sound can often be heard from the refrigerator. This is a normal sound produced by the pull-in or release of the armature of a current deadweight start relay when starting the compressor. The compressor motor will produce a slight and uniform sound while it is running. This sound is not easy to be heard in the daytime, but will be more noticeable at night.
3. The compressor consists of an electric motor and a compressing apparatus. During its normal operation, the motor's stator core and windings will rise to a temperature in the range of 100°C~110°C, and the temperature of the piston and cylinder of the compressing mechanism can also reach as above 100°C due to the heat produced when compressing refrigerant. Most of the heat radiates to the air through the compressor casing, therefore its casing is generally at a temperature between 85°C ~90°C. It may become very hot, particularly in Summer when the ambient temperature is higher. All these are normal phenomena.
4. For the direct cooling refrigerator, a kind of irregular crack sound can be often heard when the compressor is running for a certain period of time or has just stopped. This sound is caused by the stress relief due to expansion and contraction when temperature changes, and will not affect the normal application of refrigerator.

Maintenance Service & Troubleshooting:

6. Common problems with refrigerators and their remedies

Causes of problems occurring in refrigerators are closely related to the quality of components and workmanship in manufacture, also whether refrigerators are properly used and maintained. The parameters generally used to express the working conditions of a refrigerator include the temperature inside the refrigerator, operation rate, electric power consumption, noise level, etc. If any one of these parameters is beyond its permissible range, this indicates that there is a fault in the refrigerator.

During the whole service life of a refrigerator, the probability of problems occurring within that time is called its failure rate. Making a comparison between the control circuit system of a refrigerator and its refrigerating system, we can find that the failure rate of the former is higher, and that of the thermostat is the highest. In troubleshooting, the first thing you must do is to determine where the problem comes from – the control system or the refrigerating system. Generally there is no fault-indicating instrument mounted on the domestic refrigerator. The location and nature of problems should be determined according to their respective features; therefore experience in servicing is very important in troubleshooting.

Experienced service technicians can correctly locate them and take reasonable remedial actions based on comprehensive analysis of fault characteristics, as well as operating conditions for various kinds of refrigerators.

Three essentials to check

1. LOOK

- a. Check the refrigerating system pipework for cracks and check welding points for leaks; if leakage occurs, a definite oil stain will be seen.
- b. Check the suction and exhaust pressure values (high pressure and low pressure) of compressor to see whether they are normal.
- c. Check the conditions of frost on the evaporator: It is normal for a small amount of frost to form on it.
- d. Pay attention to the speed of temperature pull-down inside the freezer compartment. It is abnormal if the speed of temperature pull-down is obviously slower than normal.
- e. Check the environment to see whether if the location is a suitable placement for a refrigerator.
- f. Check the refrigerator door seal, case, surface and heat insulation.
- g. Look at the main control board to ascertain if its indication states are normal.

2. LISTEN

- a. Listen to the sounds produced when the compressor is running. A humming sound from a fully enclosed aggregate unit is caused by overload, indicating that the motor cannot be started normally. A clattering sound may be heard from inside the start relay, which is produced because the start contacts cannot be released normally. A whistling sound is caused by the high pressure gas flowing out of a crack in the pressure tube inside the compressor. Clucks are the sound of striking when the suspended spring inside the compressor has broken.

During normal operation of compressor, a slight and uniform hum sound due to undulation of electric current can be heard generally. This is a normal phenomenon. However, if it sounds like “tong, tong...”, i.e. an impact sound inside the compressor, this means that a large quantity of wet vapour of refrigerant or refrigerating oil

has come into the compressor cylinder. If it sounds like “dang, dang...”, i.e. a striking sound of metal parts inside the compressor, this means that some moving parts have loosened (take care to differentiate this sound from those formed during starting or stopping of the compressor).

b.Listen to the sound caused by the flowing of gas in the evaporator. Open the refrigerator door while the compressor is in operation and listen carefully to the sound of the gas flow inside the evaporator. If it sounds like gentle whistling accompanied by a sound similar to flowing water, this is the sound produced by the normal circulation of refrigerant within the evaporator. If only the gas flowing sound can be heard and there is no flowing water sound, this indicates that the refrigerant has already percolated. If neither the flowing sound nor the gas sounds from the evaporator can be heard, this means that the filter or capillary has been clogged.

3. TOUCH AND FEEL

- a. Feel the compressor when running. Its temperature should be generally less than 90°C in its normal state (though it may exceed 90° C if running for a longer period of time).
- b. After the compressor has operated normally for 5~10 minutes, touch and feel the condenser. The temperature of its upper part should be higher than that of its lower part (or its right part is hotter than its left part, depending on the type of condenser coil). This indicates that the refrigerant is circulating. If the condenser is not hot, this means the leakage of refrigerant. In case the condenser radiates heat for only several minutes and then cools down, this means that the filter and capillary have been clogged. As for the forced air cooling condenser, hot air will be blown out of it. This means that the system is out of order.
- c. Feel the filter's temperature. During normal operation of refrigerating system, the temperature on the filter's surface should be a little higher than the ambient temperature. if you touch it with your hand, you will have a sense of slight heat. If dew condensation appears (due to the fact that its temperature is obviously lower than the ambient temperature) this means that most meshes of its screen has been clogged, resulting in an obstructed flowing of refrigerant, thus causing a drop in temperature due to throttling.
- d) Feel the temperature of exhaust gas from the refrigerating system. The exhaust gas should be very hot and this is the normal working state. For refrigerators with an enclosed type of compressor refrigerating system, no frost or dew will from on the gas suction tube, otherwise there is something wrong in the system (note that frosting and dew condensation may appear for a very short time period when just starting the unit, this is a normal phenomenon). Because a refrigerator is a combination of several components, they are related and have influence on each other. In case an abnormal phenomenon has been found through the above checks, you need not make a hasty conclusion based on only one abnormal phenomenon. It is advisable to find out two or more abnormal phenomenon, or conduct comprehensive troubleshooting with the aid of instruments or other ways, because several kinds of fault may share a common abnormal phenomenon, and two or more abnormal phenomena may occur simultaneously due to a certain issue. With this method, you can reject suspicious faults and arrive at a correct judgment.

Maintenance Service & Troubleshooting:
7. Analysis of problems, and their solutions

Poor refrigerating effect

The so-called “poor refrigerating effect “ refers to the fact that the refrigerator can operate and refrigerator normally, but the temperature in the refrigerator cannot drop to the prescribed value under the stipulated working conditions. Given that there may be many causes for this phenomenon, we are going to discuss and analyse it by the following aspects:

1. LEAKAGE OF REFRIGERANT

ANALYSIS

The leakage of refrigerant in the system will result in an insufficient refrigerating capacity. The resulting phenomena are its lower gas suction pressure and exhaust pressure as well as higher exhaust gas temperature. The exhaust tube feels rather hot, a continuous gas flowing sound that's louder than usual may be heard at the outlet of the capillary, and no frost or a smaller quantity of loose frost appears on the evaporator. After shut down, the balance pressure in the system is usually lower than the saturation pressure corresponding to the same ambient temperature.

REMEDY

In case there is leakage of refrigerant from the system, do not hurry to recharge it with refrigerant, manage to find out leak points immediately, and make a note of from where it leaks, i.e. welding points and parts. After having them repaired, recharge refrigerant.

There are so many joints and sealed surfaces in a refrigerator, many potential leak points do exist in the system. In troubleshooting, pay attention to those parts that are liable to leak. Check main connection points for oil seepage and tubing for cracks. If there is no severe leak point, charge the system with nitrogen and detect leak points with the commonly adopted method, repair them, evacuate, charge the system with refrigerant, and then turn on the refrigerator to make a test run.

2. TOO MUCH REFRIGERANT CHARGED INTO THE SYSTEM

ANALYSIS: Either

- a. If the amount of refrigerant charged into the system exceeds its nominal capacity, the superfluous refrigerant will necessarily take some space of the evaporator, thus reducing its heat-dissipation area and hence the refrigerating efficiency of the system. The abnormal phenomena caused by this reason are as follows: the gas suction and exhaust pressures are generally higher than their respective normal values; the temperature of its condenser is higher and the electric current of the compressor rises; loose frost forms on the evaporator; the refrigerator temperature drops slowly; and frost appears on the gas return tube.

or

- b.If excessive refrigerant has been charged, the liquid refrigerant that cannot evaporate in the evaporator will return to the compressor, and thus a phenomenon of “liquid striking” will occur. The liquid refrigerant evaporates and effervesces as soon as it flows into the refrigerating oil at the bottom of compressor. If the condition is severe, foam will fill inside the compressor housing and be sucked by the piston, causing damage to the components of compressor.

REMEDY

According to the operating procedures, you MUST to turn the machine off, wait several minutes, then open the refrigerant charging tube to let the refrigerant escape. Replace the dry filter, recharge refrigerant after evacuating, and then seal the charging port.

3. THERE IS AIR LEFT IN THE REFRIGERATING SYSTEM

ANALYSIS

Residual air in the refrigerating system will reduce its refrigerating efficiency. The main phenomena are:the increase in its gas suction and exhaust pressures (note however that the gas exhaust pressure will not exceed its rated value), and an obvious increase in temperature in the segment from the compressor outlet to the condenser inlet. Because there is air in the system, both the gas exhaust pressure and temperature will rise, moreover the gas flowing sound is intermittent and obviously louder.

REMEDY

Shut the unit down, wait several minutes, then open the tubing, evacuate it and recharge the system with refrigerant.

4. LOW EFFICIENCY OF COMPRESSOR

ANALYSIS

Low efficiency of a refrigerating compressor refers to the actual reduction of gas discharge capacity, and hence the corresponding reduction of refrigerating capacity, under the condition that the refrigerant in the system is unchanged. This phenomenon occurs mostly when the compressor has been used for quite a long time, its moving parts will have worn to a considerable degree, fit clearance between various parts have increased and sealing property of its gas valve has deteriorated, resulting in an decrease in its actual gas discharge capacity.

METHODS OF JUDGMENT

Measure the high and low pressures with pressure gauges to see whether they are normal. If an abnormal sound comes from the compressor or the temperature of its causing is too high, cut the discharge port open and operate the compressor. Feel if there is pressure at the discharge port with your finger – for a normal compressor, its discharge port is difficult to be blocked with your finger if you just apply a little pressure.

5. TOO THICK A FROST LAYER IS FORMED ON EVAPORATOR

ANALYSIS

If a direct cooling refrigerator is to be used for a prolonged period of time, be sure to defrost its evaporator regularly. If you fail to do so, the frost layer on the evaporator tubing will become thicker and thicker. Heat conduction will be severely affected if the whole tubing is wrapped with an ice layer, and hence the temperature in the refrigerator cannot drop down to the prescribed range.

REMEDY

Turn the refrigerator off, and make preparations for defrosting. Open the refrigerator door to let air in, or use a fan to speed up the flow of air, to shorten the time needed for defrosting. Never attempt to speed up defrosting by chipping at the ice with sharp tools: this may cause damage to the evaporator tubing, or cause personal injury.

6. REFRIGERATING OIL LEFT IN EVAPORATOR TUBING

ANALYSIS

During a normal refrigerating cycle, a little refrigerating oil may remain in the evaporator tubing. After a prolonged life, if there is considerable refrigerating oil left in the evaporator, the heat conduction effect will be severely affected thus causing a poor refrigerating effect.

REMEDY

It may be difficult to determine whether this problem is caused by the refrigerating oil left in the evaporator tubing, because this kind of phenomenon, amongst other several faults, tend to be confused. Generally speaking, you can make a judgment based on the frost formed on the evaporator. If the frost does not cover the evaporator and it is loosely formed, you can make a judgment that the deterioration of refrigerating effect is due to the accumulation of refrigerating oil left in the evaporator tubing, if no other fault has been found. To clear refrigerating oil left in the evaporator, dismantle the evaporator, purge it thoroughly and then dry it. If it is difficult to dismantle, charge refrigerant from the evaporator inlet to wash it several times, then purge and dry it with nitrogen.

6. FLOWING OBSTRUCTED IN REFRIGERATING SYSTEM

ANALYSIS

Because the refrigerating system was originally not purged thoroughly, some of the filter screen meshes have been clogged by dirt accumulated in the filter after use, thus resulting in a decrease in flow rate, and hence a poorer refrigerating effect. The abnormal phenomena caused by this kind of slight clogging in the system are as follows: the gas discharge pressure is lower, the temperature of discharged gas drops, the position clogged has a temperature lower than that in its normal condition and, for a severe clogging, even dew condensation as frost may appear.

REMEDY

Purge the tubing, replace the dry filter with a new one or clear it thoroughly, recharge the system with refrigerant and seal the charging port.

No refrigerating

The phenomenon whereby the compressor runs normally, but no or little frost appears on the evaporator and the refrigerator temperature does not pull down is called “no refrigerating”. There may be many causes for this and it is relatively complicated to determine. In servicing, give special attention to finding direct causes for this phenomenon. Three main potential causes for this fault are analysed below:

1. ALL REFRIGERANT IN THE SYSTEM HAS LEAKED OUT

ANALYSIS

Leak points in the refrigerating system have not been repaired timely, thus resulting in the total escape of refrigerant. There are two main kinds of leakage:

- i. Slow leakage: if, for example, a refrigerator that has out of service for a long time, leakage of refrigerant may be develop or, in the course of its operation, a refrigerator may become gradually not so cold and finally does not refrigerate at all;
- ii. Fast leakage: if, for example, all the refrigerant escapes swiftly due to abrupt rupture of system tubing. Symptoms of total leakage of refrigerant may include the compressor starte easily (if there is no damage to the compressor parts) but its operating current becomes low; its gas suction pressure is high and discharge pressure is lower; the gas discharge tube feels cold; no sound of gas eruption from the liquid in the evaporator can be heard, and no gas escapes from the process tube if you cut it open after shutdown.

REMEDY

Check the whole machine, particularly those locations which are liable to leak. After leak points have been found, repair them or replace them with new parts according to specific circumstances. Evacuate the system and finally charge refrigerant.

2. REFRIGERATING SYSTEM HAS BEEN CLOGGED

- a. Clogged with Ice

ANALYSIS

If the dryness treatment for the major parts in the refrigerating system has been performed improperly, the effect of air purging for the whole system is not good, or the water content in the refrigerant is out of standard, all these will cause the expansion valve to become clogged with ice. The symptoms for this fault are as follows: the refrigerator sometimes refrigerates and sometimes does not; the refrigerator compartment works normally at the beginning but, after working for a certain period of time, frosting begins at the clogged position; evaporation temperature reaches below 0°C; water will accumulate at the narrow part of the capillary and gradually clog it then frost begins to melt at the evaporator; no gas flowing sound can be heard, and the gas suction pressure assumes a state of vacuum. Note that these phenomena will appear intermittently: sometimes the refrigerator works well, and sometimes it does not. In order to determine whether it is clogged

with ice, heat the suspect points with hot water to melt the ice. If after a while the sound of an abrupt gush of flowing gas is heard and gas suction pressure rises, it can be confirmed that the problem is caused by ice clogging.

REMEDY

If there is too much moisture in the refrigerating system, it is advisable to release the refrigerant, purge the tubing with nitrogen, and then charge the system with the filtered refrigerant. However, the commonly adopted method is to connect a filter with moisture absorbers (such as silica gel, anhydrous calcium chloride) to the refrigerating system to filter out the moisture from the system. Then replace the filter, evacuate it again and finally charge the system with refrigerant.

b.Clogged with dirt in capillary

The capillary inlet is a place where coarse-grained dirt or refrigerant oil in the system will tend to settle and clog it. In case considerable dirt accumulates there and the whole filter screen may be totally blocked, making the refrigerant unable to go through. Clogging with dirt exhibits the same symptoms as that with ice, namely, higher gas suction pressure, lower temperature of discharged gas, and no sound of flowing gas may be heard from the evaporator. The difference between the two is as follows: if the clogging is caused by dirt, tapping the suspected clogged point (generally in the capillary or the connection joint of the filter) may cause the refrigerant to flow partially, resulting in some corresponding change, whereas if you heat it with a hot towel, no reaction will happen and no flowing sound can be heard, moreover there will be no periodic change. After rejecting the possibility of clogging by ice, it may generally be considered as clogging due to dirt.

REMEDY

Dismantle the system, remove the dry filter from it, purge the tubing with nitrogen, install a new filter, then evacuate it and finally charge it with refrigerant.

c. Clogging in filter

Total clogging of a filter is rare. This fault is mostly caused by a paste-like matter formed from the substances filled into the system or other dust after the refrigerator has been used for a longer time, or by the dirt accumulated gradually inside the filter.

Sometimes, tapping the filter may cause a small passage that allows limited flowing. By touching it with your hand, you will feel that it is cooler compared with its temperature in the normal state.

REMEDY

The same as described in the capillary clogging with dirt.

3. PROBLEMS WITH COMPRESSOR

Breakage of gas suction and discharge valve blocks

ANALYSIS

The compressor works by opening and closing a gas suction valve and discharge valve to suck and discharge the refrigerant. If the valve block is broken, the refrigerant can not be discharged, and hence no refrigerating can be achieved.

METHODS OF JUDGMENT

It is quite difficult to differentiate this problem from others because they often have similar symptoms. First listen attentively for some abnormal sound coming from the compressor (sometimes the broken pieces of valve block may strike against the cylinder), and feel the compressor casing with your hand to ascertain

whether it is too hot. Secondly, measure the pressures at the high and low pressure ports of the compressor with pressure gauges. if the gas suction valve block is broken, the suction pressure gauge pointer will swing violently and the suction pressure is very high. If the gas discharge valve block is broken, the discharge pressure gauge pointer will swing drastically and the discharge pressure is very high. In both cases, stop the compressor at once and, if possible, open the cylinder cover and check the valve block. Repair it, or replace it with a new one.

Sudden stopping of compressor during Its running

The cause of the sudden stop of a compressor during its running is mostly that the gas suction pressure and/or discharge pressure exceed their respective prescribed ranges. This will make a pressure-operated protective relay shut off the power to the compressor and stop it. In the following we discuss the main reasons for causing excessively high gas discharge pressure and low suction pressure.

1. Stoppage due to excessively high gas discharge pressure

a. Too much refrigerant charged into the system

ANALYSIS

Phenomena such as loose frost and poor refrigerating effect may occur if excessive refrigerant has been charged into the system. Superfluous refrigerant will occupy a certain space of the evaporator, thus reducing its heat dissipating area, and the phenomenon of “liquid striking” may occur, too. Meanwhile, dew or frost condensation may occur on the gas return tube, and the gas discharge pressure will obviously rise. When it reaches the threshold value, the protective relay will actuate and shut off the power supply to the compressor.

REMEDY

Open the tubing, re-evacuate and then charge the system with a proper quantity of refrigerant.

b. Air left in the system

ANALYSIS

The residual air in the system will circulate together with the refrigerant in the system. The major symptoms caused by this residual air is higher gas discharge pressure, higher discharged gas temperature (the gas discharge tubing is very hot when you feel it with your hand), and poorer refrigerating effect. Furthermore, the gas discharge pressure will exceed its normal value when the compressor has run for a period not too long, thus making the protective relay actuate and bring to a stoppage.

REMEDY

Check how the air has been left in the refrigerating system. Generally, there are two possibilities: one is that the air has been sucked into the system when repairing due to carelessness, or it has not been purged out totally when evacuating the system; the other is that there are leak points at the low pressure end of the refrigerating system. Leak points appear mostly in those low temperature parts or assemblies – because the evaporation temperature is lower for such low temperature devices, especially at the low pressure end, it is easier for the air to go into the system. Once it has been ascertained that air does exist in the system, open the tubing, re-evacuate it and then charge it with refrigerant.

2. Stoppage due to electric fault

a. Thermostat is out of control

ANALYSIS

If the thermostat does not work correctly or its temperature sensor has not been installed properly, frequent stoppage is also likely to occur.

REMEDY

Try to adjust the temperature sensor’s position until the compressor can be started and stopped normally. If this cannot be achieved, and the stoppage still occurs repeatedly, it is most likely that the mechanical parts or contacts are out of order. Disassemble the thermostat, check thoroughly and repair it.

b. Overload of electric motor

ANALYSIS

Too many things may have been put into the refrigerator, and hence the thermal load exceeds its refrigerating capacity. Alternatively if the power supply voltage drops considerably, the current flowing through the motor will increase drastically, making the thermal protector actuate and the fuse blow, hence the motor stops running. If the motor is still running continuously in such a case, its windings may be burned out.

REMEDY

Reduce the thermal load, pay attention to the variation in voltage of the power supply.

c. Abnormal thermal protection.

ANALYSIS

The compressor current is within its normal range, but the thermal protector actuates repeatedly.

REMEDY

Replace the thermal protector with a new one.

Sudden stoppage due to other causes

Normal starting and stopping of the compressor is generally controlled by a thermostat. When the temperature in the refrigerator reaches its desired value, the thermostat will stop the compressor automatically. Never take this normal operation as a problem – care should be taken to differentiate it from other real problems in servicing.

Compressor won’t start

In case the compressor cannot be started, you must find out the origins of this fault through checking step by step. There may be many causes, including electrical and mechanical.

1. Inspect the power supply to see whether it is connected to the compressor circuit.

ANALYSIS

In case the compressor cannot be started, this will generally exhibit in the power supply circuit. For instance, power failure, poor contact of switch, and blown fuse. Make a comprehensive analysis of these phenomena, discover its real cause and take correct measures to remove this problem.

REMEDY

- a. Check the input power circuit to see where there is voltage to the power supply, namely, the circuit which is connected to the knife switch. This can be determined with an avometer or a test pencil. If a blown fuse is found, ascertain and remove its cause, then replace it with a new one of the same specifications.
- b. Check the compressor accessories, including its thermal protector and relay. If the thermal protector is damaged, the compressor cannot be powered on. If the relay is out of order, the motor will not run and a humming sound can be heard from it after the compressor is turned on. if this is the case, shut it down immediately, otherwise the motor windings will be burned out in case this condition lasts longer.

2. Check the relay contacts and plugs to see if they are in good order and work reliably. Poor contact may cause

the motor not running or humming. 2) Check the circuit voltage to see whether it is normal.

ANALYSIS

If the circuit voltage is obviously lower than its rated value, it will be difficult to start the motor and a humming sound can be heard from it.

REMEDY

Measure the voltage with a voltmeter. if it is too low, give directions to the user for buying a stabiliser to step up the voltage. Thus normal operation can be achieved.

3. Check the thermal relay to see whether its contacts are closed.

ANALYSIS

The contacts of thermal relay sometimes may be open due to the leakage of temperature sensing agent from the temperature sensor.

REMEDY

Remove the relay cover to check up its contacts. If they are open, this means that the original setting is not properly set or temperature sensing agent has leaked out of the temperature sensor. Try to turn the adjusting stem of this value in the direction of the lower temperature graduation, then check the contacts to see whether they are closed. If they are still not closed, dismantle the temperature sensing disc and then immerse it into warm water to see whether the contacts actuate, if not, it can be preliminarily determined that temperature sensing agent has leaked out, and it must be replaced with a new thermostat.

4. MOTOR PROBLEMS AND OTHER ELECTRICAL FAULTS

Motor windings have burned out or short-circuited between turns.

ANALYSIS

When motor windings have burned out or short-circuited between turns, the fuse will be blow repeatedly, and the blowout occurs particularly at the instant when you close the knife switch.

REMEDY

Check the terminals and the outer casing to see whether they are short-circuited, and measure the resistance of each phase with an ohmmeter. If short circuit occurs or the resistance of a certain phase is low, this means that short circuit does exist in the windings and/or between turns, and insulation layers have been burned or deteriorated. A multimeter can also be used in this inspection. If the insulation resistance is lower than 2MΩ, this means that the insulation layer is already broken down. If the motor has been burned, repair it or replace it with a new one.

Fault of control relay

ANALYSIS

Overheating, burnout or wear of control relay contacts may occur generally. All these will cause poor electrical contact.

REMEDY

Dismantle it to repair, or replace it with a new one.

Poor electric contactor in thermostat

ANALYSIS

Burnout of contactor and leakage of temperature sensing agent may occur generally.

REMEDY

Replace the old with a new one.

Check the terminals for loose connection and electric circuits for other abnormal phenomena.

5. MECHANICAL FAULTS OF COMPRESSOR

Seizing of shaft

This phenomenon is caused mostly by poor lubrication, such as insufficient quantity of lubricant, clogging in the lubricant oil line, or intermittent lubricant oil supply. Dirt and other impurities in the lubricant oil will increase its viscosity and cause the shaft to be seized. Copper plating may also result in seizing of shaft.

Seizing of piston

This is caused by too small fit clearance between the piston and cylinder or expansion due to heat. Judgment of seizing shaft and piston: After the refrigerator has been powered on, the compressor will not start and run, but a slight humming sound can be heard, and several seconds later, a thermal protective relay will actuate and make the contacts open. This process will occur repeatedly but the compressor cannot be started.

Compressor won’t stop

Sometimes, the compressor will run continuously for several hours or run without end. If the food placed in the refrigerator is not too much, there may be the following two situations:

- i. If the refrigerator is at a very low temperature, the control system is probably out of order;
- ii. The control system works normally, and there are faults in the refrigerating system or other parts.
 - 1. Temperature is set improperly
 - a. The temperature control knob is set to the “coldest” position. This position is to be used for fast freezing or continuous running. it’s temperature for power off is too low, therefore the compressor won’t stop and the temperature in the refrigerator becomes lower and lower.
 - b. Inspection method: check the temperature control knob to see whether it is set in the position “coldest”.
 - 2. Thermostat is malfunctioning and makes the compressor running continuously

ANALYSIS

When the thermostat doesn’t work normally it will make the compressor run continuously, and hence very low temperature will be achieved in the refrigerator. The fault is generally due to the fact that the contacts of the thermostat cannot be released.

REMEDY

Dismantle the thermostat and make a through check. If it is totally out of order, replace it with a new one.

- 3. Evaporation temperature is too high in refrigerating system, resulting in lower refrigerating capacity and hence continuous running of compressor

ANALYSIS

Leakage of refrigerant and clogging in a refrigerating system will directly affect its refrigerating capacity. Due to the reduction in its refrigerating capacity, the refrigerator temperature cannot reach its rated value and the thermostat won’t work, thus the compressor runs continuously. When the evaporation temperature in the system is too high, the temperature sensing agent in the temperature sensor is also hotter. Therefore the thermostat is unable to cut off the power supply to the compressor and stop it.

REMEDY

If it has been found that the refrigerant in the system is insufficient in quantity, recharge it with refrigerant.

In case clogging occurs, disassemble the part where it is blocked. If the evaporation temperature is too high, resolve this problem with an appropriate quantity of refrigerant.

- 4. No stoppage of compressor due to damaged heat-insulation layer inside case body and/or door seal

ANALYSIS

When the heat-insulation layer inside the case body deteriorates or the door seal is not secure in the door frame, the temperature in the refrigerator will rise and makes the compressor running continuously.

REMEDY

Check the heat insulation layer for its damaged parts and repair it to improve its heat insulation property. If the door is deformed or the door seal is not tightly sealed against the case body, repair them.

- 5. Too much food is placed in the refrigerator or is placed too densely. This can result in poor ventilation or poor conditions for temperature sensing, and hence the compressor does not stop.
- 6. Too high ambient temperature, poorer ventilation and heat dissipation makes the compressor running without stopping.

5. ELECTRICAL LEAKAGE OF REFRIGERATOR

- 1. Slight electric leakage

Electric insulation has deteriorated due to being affected with damp, thus resulting in slight electric leakage.

- 2. Serious electric leakage

Refrigerator case has become live due to faults occurred in some electric devices or the erroneous wiring in installing power cord plug or outlet by the user. **THIS IS EXTREMELY DANGEROUS.**

- 3. Electric leakage test

a)Slight electric leakage

A tingle sense will be experienced if you touch the metal parts of the refrigerator with your hand. When you test them with a test pencil, its neon lamp will come on. In that case, the first thing you need to do is to determine whether the grounding is perfect. If the grounding is good, turn off the refrigerator immediately and check the insulation of electric circuits with an multimeter.

b)Serious electric leakage

Never touch the case body of the refrigerator, its door handle or other metal parts with your hand. Test the refrigerator with a test pencil, it will light up intensively. Measure the resistance between the power cord plug and the case body with an avometer, the reading will be zero (0Ω). in the worst case, the fuse will be blown. Check the 3-prong outlet to see whether the live wire and the negative wire are inversely connected, this makes the ground protection lead-out from the power cord plug being connected to the live wire. Another possibility is that the live wire and negative wires of the outdoor power supply circuit have been inversely connected accordingly, this makes the negative wire become a live wire.

6. STRONG VIBRATION AND LOADER NOISE

- 1. Refrigerator placed improperly

a. Uneven ground

Uneven ground will cause the refrigerator to become unsteady, causing stronger vibration and noise during its operation.

b.Leveling screws not properly adjusted

If the leveling screws on refrigerator legs have not been adjusted properly, vibration and noise will still occur even if the refrigerator has been placed on a level ground.

2.Abnormal noise from compressor

Three suspended spring inside the compressor case may be out of balance, and strike against the case. Moreover, the wear of compressor parts may cause noise sometimes.

3.Resonance of pipework and loosening of parts

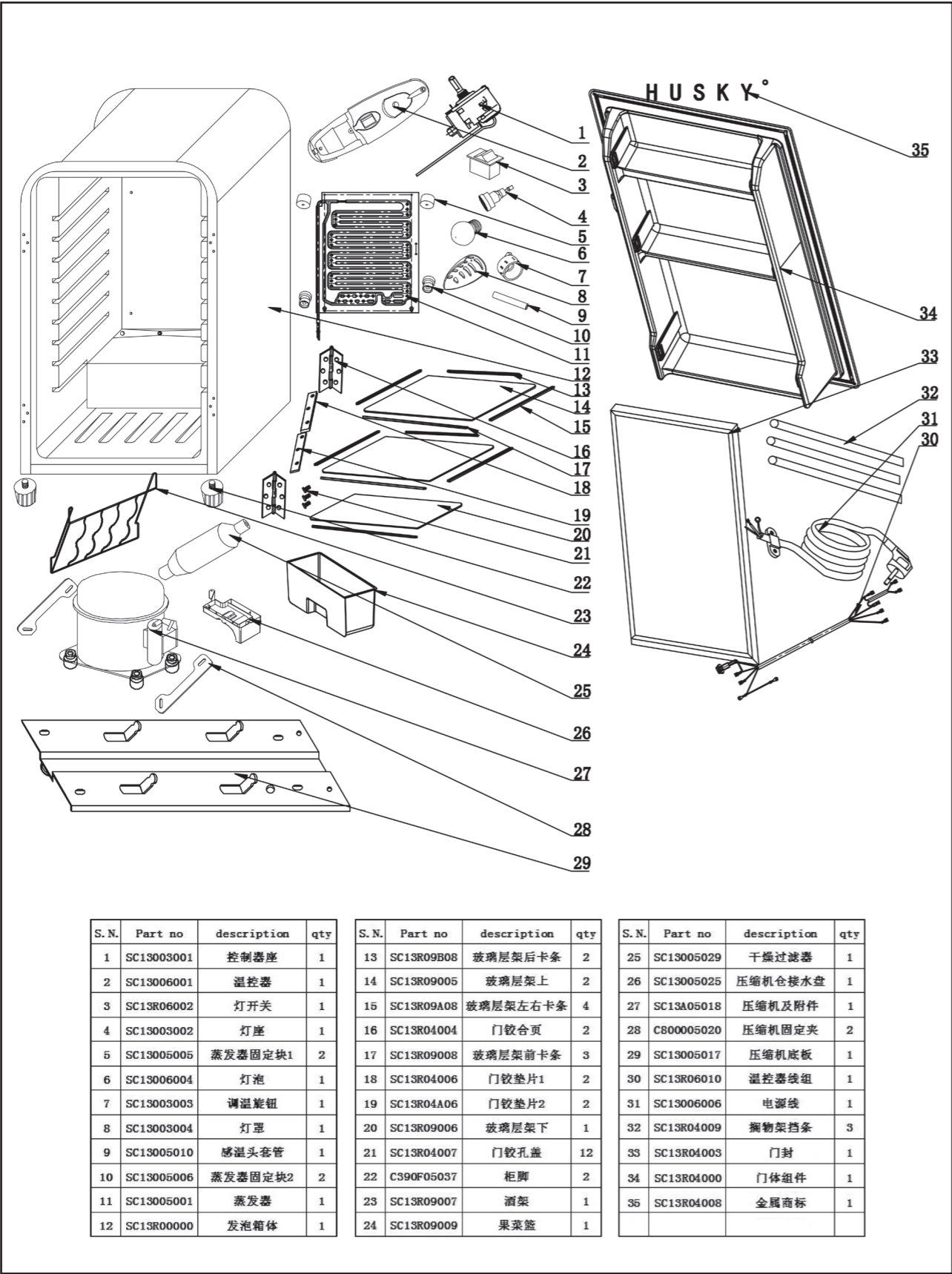
Improper and compact laying of pipes or the loosening of parts may cause vibration and noise.

4.Inspection method

To find the sources of noise, press the vibration spot with your hand while the refrigerator is in operation and listen attentively whether the vibration becomes weak or stops. If the refrigerator has not been placed levelly, put a spirit level on its top and adjust the leveling screws on its legs. In case noise occurs from the compressor, strike different locations on the side surface of its case using a rubber hammer or hand hammer with a wood block in between to avoid damage, to determine whether the suspended springs are out of balance or seized.

Exploded Diagram

Only to be used in conjunction with the Parts List on page 31.



Parts List

Only to be used in conjunction with the Exploded Diagram on page 30.

Ref. on Diagram	Part Number	Description	Quantity
1	SC13003001	Controller socket	1
2	SC13006001	Controller	1
3	SC13R06002	Light switch	1
4	SC13003002	Socket	1
5	SC13005005	Evaporator fix plate 1	2
6	SC13006004	Bulb	1
7	SC13003003	Controller knob	1
8	SC13003004	Lampshade	1
9	SC13005010	Sensor sleeve	1
10	SC13005006	Evaporator fix plate 2	2
11	SC13005001	Evaporator	1
12	SC13R00000	Cabinet	1
13	SC13R09B08	Trim (back piece)	2
14	SC13R09005	Upper glass shelf	2
15	SC13R09A08	Trim (left and right piece)	4
16	SC13R04004	Door hinge	2
17	SC13R09008	Trim (front piece)	3
18	SC13R04006	Door hinge washer 1	2
19	SC13R04A06	Door hinge washer 2	2
20	SC13R09006	Bottom glass shelf	1
21	SC13R04007	Door hinge cover	12
22	C390F05037	Feet	2
23	SC13R09007	Wine rack	1
24	SC13R09009	Salad drawer	1
25	SC13005029	Dryer filter	1
26	SC13005025	Compressor drip tray	1
27	SC13A05018	Compressor component	1
28	C800005020	Compressor fix clip	2
29	SC13005017	Compressor installation plate	1
30	SC13R06010	Controller component	1
31	SC13006006	Power cable	1
32	SC13R04009	Retainer	3
33	SC13R04003	Gasket	1
34	SC13R04000	Door	1
35	SC13R04008	HUSKY logo	1



Husky Retail Ltd.
Station Road, Lutterworth LE17 4AP, U.K.
Tel: +44 (0)1455 555397 Fax: +44 (0)1455 555376
Visit our web site: www.husky-retail.com